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EXAMINER

PARSONS, THOMAS H

ART UNIT	PAPER NUMBER
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1745

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Please find below and/or attached an Office communication concerning this application or proceeding.



## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities:

Page 12, lines 23 and 25, suggest changing "15" to --11--; and,

Page 13, line 2, suggest changing "15" to --11--.

Appropriate correction is required.

### ***Claim Objections***

2. Claim 1 is objected to because of the following informalities:

line 6, after housing, suggest changing the semicolon(;) to a period (.).

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6, 9, 11, 14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holcombe (5,516,603).

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**Claim 1:** Holcombe in Figures 1 and 2 discloses a battery, battery comprising:

a battery (22); and

a housing (24) enclosing and sealing a volume containing the battery, the housing being expandable and contractible to balance pressure internal to the housing with pressure external to the housing (abstract; col. 1: 53-63, col. 2: 10-42, and col. 3: 6-21).

More particularly, Holcombe discloses that the flexible battery pack may be mounted about the interior and exterior circumference of a downhole tool. The flexible battery pack mounted in the tool would obviously provide a housing being expandable and contractible to balance pressure internal to the housing with pressure external to the housing.

Further, since the battery of Holcombe is structurally similar to what is instantly claimed, it obviously would have provided a pressure-balanced battery.

The recitation “**for powering downhole drilling components in a subterranean environment**” has been considered, and construed as a statement of intended use and adds no additional structure to the battery. However, since the battery of Holcombe is structurally similar to what is instantly claimed, it obviously would be capable of provided the intended use.

**Claims 2 and 15:** The limitation “wherein the housing is in operable communication with downhole fluids” has been considered but adds no further structural limitation to the battery. However, because Holcombe discloses on col. 1: 10-17 that the tool can be placed downhole, the housing would obviously be in operable communication with downhole fluids.

**Claims 3 and 16:** Holcombe discloses in the abstract that the housing is integrated into the annular structure (interior) of a downhole tool.

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**Claims 4 and 17:** The recitation “wherein at least a portion of the housing is at least one of machined, milled, cast, and forged into a downhole tool” has been considered but adds no further structural limitation to the housing.

**Claims 5 and 18:** Holcombe discloses a battery comprising a plurality of cells (22) electrically connected in at least one of series, parallel, and a combination thereof, within the housing (col. 2: 37-49 and col. 3: 14-17 and 27-29).

**Claims 6 and 19:** Holcombe discloses further comprising at least one battery terminal (28, 18), connected to the battery (22), accessible through an opening in the housing (i.e. via output terminals (30)).

**Claim 9:** Holcombe in Figure 1 teaches a plurality of electrochemical generators (cells 22) linked together and housed in a flexible casing (i.e. a flexible battery pack) but is silent as to a casing having a shape selected from the group consisting of a substantially planar shape, a substantially cylindrical shape, and a substantially semi-cylindrical shape.

However, Holcombe on col. 2: 10-14 teaches that the battery pack can be flattened or formed onto different shapes depending upon the shape or diameter of the tool.

Therefore, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the casing to provide the claimed shape.

**Claim 11:** The recitation “wherein the battery is in operable communication with at least one of the group consisting of a downhole network, other downhole tools, and transmission elements configured to transmit information between downhole tools” has been considered but adds no further structural limitation to the battery. However, because Holcombe discloses on col.

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1: 10-17 that the tool can be placed downhole, the battery would obviously be capable of operable communication as claimed.

**Claim 14:** Holcombe in Figures 1 and 2 discloses a battery, battery comprising:  
a battery (22); and  
a housing (24) enclosing and sealing a volume containing the battery, the housing comprising:  
a substantially rigid portion;  
a resilient portion deformable to vary the volume of the housing, the resilient portion balancing pressure internal to the housing with pressure external to the housing (abstract; col. 1: 53-63, col. 2: 10-42, and col. 3: 6-21).

More particularly, Holcombe discloses that the flexible battery pack may be mounted about the interior and exterior circumference of a downhole tool. The flexible battery pack mounted in the tool would obviously provide a housing comprising both a rigid and a resilient portion with the resilient portion balancing pressure internal to the housing with pressure external to the housing.

Further, since the battery of Holcombe is structurally similar to what is instantly claimed, it obviously would have provided a pressure-balanced battery.

The recitation “**for powering downhole drilling components in a subterranean environment**” has been considered, and construed as a statement of intended use and adds no additional structure to the battery. However, since the battery of Holcombe is structurally similar to what is instantly claimed, it obviously would be capable of provided the intended use.

**Claims 20 and 21:** Holcombe discloses a method for providing power to downhole drilling components in a subterranean environment, the method comprising:

providing a battery (22);

providing a sealed housing for the battery, the sealed housing having a resilient portion flexible (flexible battery pack) to vary the volume within the housing (claims 15 and 16).

Because the housing of Holcombe is structurally similar to what is instantly disclosed, and the housing of Holcombe is situated in a downhole tool and subjected to a subterranean environment, it would have been obvious to one of ordinary skill in the art at the time the invention was made that flexing the resilient portion to balance pressure internal to the housing with pressure external to the housing would occur while providing power to downhole drilling components in a subterranean environment and, similarly, that flexing would be actuated by communication between downhole fluids and the resilient portion of the housing while providing power to downhole drilling components in a subterranean environment.

5. Claims 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holcombe as applied to claim 1 above, and further in view of Hikmet et al. (6,528,204).

Holcombe is as applied, argued, and disclosed above, and incorporated herein.

**Claim 7:** Holcombe does not disclose battery comprising an electrolyte selected from the group consisting of a fluid electrolyte and a solid electrolyte.

Hikmet et al. in Figures 3 and 4 disclose a battery comprising a fluid electrolyte.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the battery of Holcombe by substituting the battery with

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the battery of Hikmet et al. because Hikmet et al. teach that it is known to incorporate a fluid electrolyte into a battery (col. 4: 16-18) that would have contributed to improving current efficiency thereby improving overall battery performance and cost.

**Claim 13:** Holcombe does not disclose a rechargeable battery (i.e. a secondary battery) (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the battery of Holcombe by substituting the battery with the battery of Hikmet et al. because Hikmet et al. teach a secondary battery (col. 4: 16-18) that would have provided an improved current efficiency thereby improving overall battery performance and cost.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holcombe as applied to claim 1 above, and further in view of Lake (5,326,652).

Holcombe is as applied, argued, and disclosed above, and incorporated herein.

**Claim 7:** Holcombe does not disclose battery comprising an electrolyte selected from the group consisting of a fluid electrolyte and a solid electrolyte.

Lake in Figures 1 and 3 disclose a battery comprising a solid electrolyte (col. 1: 25-27 and col. 3: 32-34).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the battery of Holcombe by substituting the battery with the battery of Lake because Lake teaches that it is known to incorporate a sold electrolyte into a battery (col. 1: 25-27) that would have provided the battery with a long shelf life and operating



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efficiency over a wide temperature range thereby improving overall cost and battery performance.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holcombe as applied to claim 1 above, and further in view of Steyn (6,007,932).

Holcombe is as applied, argued, and disclosed above, and incorporated herein.

**Claim 8:** Holcombe does not disclose a fuel cell.

Steyn in Figure 1 discloses a fuel cell.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the battery of Holcombe with the fuel cell of Steyn because Steyn teaches a fuel cell that would have allowed electrical interconnections between separately aligned fuel cells in order to produce a high voltage output, and would have eliminated the need to separate external reactant source thereby improving overall cost and performance.

8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holcombe as applied to claim 1 above, and further in view of Das et al. (6,705,406).

Holcombe is as applied, argued, and disclosed above, and incorporated herein.

**Claim 10:** Holcombe does not disclose a battery installed into at least one recess formed in the wall of a downhole tool.

Das et al. in Figures 2 and 3 disclose a battery (120) disposed within a recess (cavity 121) formed within the wall of a downhole tool (125) (col. 3: 49-col. 4: 32).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the tool of Holcombe by incorporating the recess of Das et al. because Das et al. teach a battery disposed within a recess formed within the wall of a downhole tool that would have provided a means for replacing the battery pack that does not require major disassembly thereby improving maintenance costs and lowering downtime.

9. Claim 12 rejected under 35 U.S.C. 103(a) as being unpatentable over Holcombe as applied to claim 1 above, and further in view of Finger (5,451,881).

**Claim 12:** Holcombe does not disclose a signal-conditioning module to modify characteristics of power output from the battery.

Finger discloses a signal-conditioning module to modify characteristics of power output from the battery (col. 13: 60-col. 14: 10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the battery of Holcombe by incorporating the signal conditioner of Finger because Finger discloses a signal-conditioner that would have precisely rescaled the actual battery voltage to an optimum voltage range for an A/D converter thereby improving the overall operation and performance of the battery.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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**PATRICK JOSEPH RYAN**  
**SUPERVISORY PATENT EXAMINER**

Thomas H Parsons  
Examiner  
Art Unit 1745

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